



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,520	02/19/2004	Bruce J. Clingerman	8540G-000184	4716

27572 7590 11/02/2006

HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS, MI 48303

EXAMINER
----------

CHUO, TONY SHENG HSIANG

ART UNIT	PAPER NUMBER
----------	--------------

1745

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/782,520

Applicant(s)

CLINGERMAN ET AL.

Examiner

Tony Chuo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7, 9-12 and 25-42 is/are allowed.
- 6) ☒ Claim(s) 13, 19-21, 23, 24 and 43-50 is/are rejected.
- 7) ☒ Claim(s) 14-18, 22 and 51 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 1-7 and 9-51 are currently pending. The amended claims 1-2, 13-14, 25-27, and 39 do overcome the previously stated 102 and 103 rejections. Therefore, the rejections for claims 1, 25, and all claims that depend from claims 1 and 25 are withdrawn. However, upon further consideration, claims 13, 19-21, 23-24, and 43-50 are rejected under the following 103 rejections.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13, 19-21, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elhamid et al (US 2005/0106424) in view of Stuhler et al (US 6612385), and further in view of Skala (US 2005/0158601). The Elhamid reference discloses a method of operating a fuel cell having a hydrogen source "14" connected to an anode inlet of a fuel cell stack "12" and an oxygen source connected to a cathode inlet of the fuel cell stack, a cathode inlet being connected to a compressor "26" and a blower "38" (See paragraph [0010],[0011],[0012] and Figure 1). Examiner's note: The blower "38" and compressor "26" are construed as being low voltage because they are

Art Unit: 1745

both powered by a storage device "20" that could be a battery or capacitor. However, the reference does not expressly disclose high voltage compressor; ceasing operation of the blower when the voltage output of the fuel cell stack has reached a predetermined value; or ceasing operation of the blower when the voltage output of the fuel cell stack is sufficient to support operation of the compressor. The Stuhler reference discloses a compressor that is operated by the high voltage generated from the fuel cell; and a process to switch from low voltage to high voltage when the voltage at the output of the fuel cell stack reaches an adequate level to support operation of the high voltage compressor (See column 1, lines 51-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Elhamid method of operating a fuel cell to include a high voltage compressor; ceasing operation of the blower when the voltage output of the fuel cell stack has reached a predetermined value; or ceasing operation of the blower when the voltage output of the fuel cell stack is sufficient to support operation of the compressor in order to more efficiently utilize the electricity generated by the fuel cell.

However, the references do not expressly disclose producing a voltage with the fuel cell stack utilizing the existing oxygen contained in the cathode side of the fuel cell stack and the hydrogen introduced to the anode inlet by opening a manual or electronic solenoid valve to release hydrogen flow; operating the low voltage blower with the voltage produced by the fuel cell stack thereby supplying additional oxygen to the cathode inlet of the fuel cell stack via the blower; and increasing the voltage produced by the fuel cell stack over time. The Skala reference discloses a method of fuel cell

Art Unit: 1745

start-up comprising introducing hydrogen in the anode channels and the existing air in the cathode channels to generate a small amount of voltage to begin to drive the air compressor; slowly starting the compressor and introducing additional air into the cathode channels; and producing more voltage by the fuel cell stack until the system is producing sufficient net power to operate under normal run control conditions (See Abstract). Examiner's note: The compressor taught by Skala is interchangeable with a blower because it is well known in the art that blowers or compressors are used to supply air to the fuel cell. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Elhamid/Stuhler method of operating a fuel cell to include steps of producing a voltage with the fuel cell stack utilizing the existing oxygen contained in the cathode side of the fuel cell stack and the hydrogen introduced to the anode inlet; operating the low voltage blower with the voltage produced by the fuel cell stack thereby supplying additional oxygen to the cathode inlet of the fuel cell stack via the blower; and increasing the voltage produced by the fuel cell stack over time in order to simplify the system as well as reducing the mass volume and cost of the system by eliminating the use of a battery to start-up the fuel cell.

4. Claims 43-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elhamid et al (US 2005/0106424) in view of Stuhler et al (US 6612385). The Elhamid reference discloses a fuel cell system comprising a fuel cell stack "12"; a hydrogen source "14" connected to an anode inlet of a fuel cell stack "12"; an oxygen source connected to a cathode inlet of the fuel cell stack; a cathode inlet connected to a

Art Unit: 1745

compressor "26" and a blower "38"; a low voltage power source "20" that could be a battery or capacitor that drives the blower; and oxidant feed gas that is generally provided as oxygen-rich air (See paragraph [0010],[0011],[0012],[0014] and Figure 1).

Examiner's note: The blower "38" and compressor "26" are construed as being low voltage because they are both powered by a storage device "20" that could be a battery or capacitor. However, the reference does not expressly disclose a high voltage compressor that is powered by the fuel cell stack once the fuel cell stack is producing voltage above a predetermined value. The Stuhler reference discloses a compressor that is operated by both a low voltage battery and high voltage from the fuel cell when the voltage at the output of the fuel cell stack reaches an adequate level (See column 1, lines 51-60). Examiner's note: Since the compressor can be powered by the electricity generated by the fuel cell stack, the blower can also be powered by the electricity generated by the fuel cell stack. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Elhamid fuel cell system to include a high voltage compressor in order to more efficiently utilize the electricity generated by the fuel cell.

***Allowable Subject Matter***

5. Claims 1-7, 9-12, and 25-42 are allowed.

Independent claim 1 is allowed because although the Elhamid reference discloses a fuel cell system comprising a fuel cell stack, a compressor, and a blower, it does not expressly disclose a method of operating the fuel cell system comprising:

Art Unit: 1745

supplementing the quantity of oxygen supplied to the cathode inlet of the fuel cell stack when the voltage output is sufficient to begin driving the high voltage compressor by simultaneously operating the high voltage compressor with the voltage output of the fuel cell stack and the low voltage blower with the low voltage power source.

Independent claim 25 is allowed because although the Pearson reference discloses operating a fuel cell stack in stand-by mode when normal operation of the fuel cell stack is not needed, it does not expressly disclose a method of operating the fuel cell system comprising: operating the low voltage blower in the stand-by mode and operating the high voltage compressor during normal mode.

6. Claims 14-18, 22, and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 51 and 14-18 are objected to as being dependent upon a rejected base claim because although the Elhamid reference discloses a fuel cell system comprising a fuel cell stack, a compressor, and a blower, it does not expressly disclose a method of operating the fuel cell system comprising: supplementing the quantity of oxygen supplied to the cathode inlet of the fuel cell stack when the voltage output is sufficient to begin driving the high voltage compressor by simultaneously operating the high voltage compressor and the low voltage blower with the voltage output of the fuel cell stack.

Claim 22 is objected to as being dependent upon a rejected base claim because although the Elhamid reference discloses a fuel cell system comprising a fuel cell stack,

Art Unit: 1745

a compressor, and a blower, it does not expressly disclose a method of decreasing the operation of the blower over time as the voltage output of the fuel cell stack increases.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-50 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a



Application/Control Number: 10/782,520

Page 8

Art Unit: 1745

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

A handwritten signature in black ink, appearing to read "Susy Tsang-Foster", written in a cursive style.

SUSYTSANG-FOSTER  
PRIMARY EXAMINER